CLAIMS

1. A method for processing microarray data, the method comprising:

rendering the microarray data for visual display;

displaying the microarray data rendered for visual display;

receiving as input a boundary of a region of feature extractability within the microarray;

constructing a regularly shaped region of feature extractability from the received boundary of the region of feature extractability within the microarray; and

extracting feature signals from the regularly shaped region of feature extractability.

2. The method of claim 1 wherein rendering the microarray data for visual display further includes preparing a pixel-based, scanned image of the microarray with indications of putative feature positions.

3. The method of claim 2 wherein displaying the microarray data rendered for visual display further includes displaying, on a computer display device, the pixel-based, scanned image of the microarray with indications of putative feature positions.

4. The method of claim 1 wherein receiving a boundary of a region of feature extractability within the microarray further includes receiving a contour line enclosing the region of feature extractability.

5. The method of claim 4 wherein the contour line enclosing the region of feature extractability is manually drawn by a user over the displayed scanned image of the microarray using a touch screen device.

6. The method of claim 4 wherein the contour line enclosing the region of feature extractability is manually drawn by a user over the displayed scanned image of the microarray using a light pen.

7. The method of claim 4 wherein the contour line enclosing the region of feature extractability is manually drawn by a user over the displayed scanned image of the microarray using mouse and keyboard input.

8. The method of claim 1 wherein constructing a regularly shaped region of feature extractability from the received boundary of a region of feature extractability within the microarray further includes:

employing nearest neighbor analysis of pixels within the region of feature extractability to generate a binary mask containing binary values, each binary value indicating whether or not a corresponding pixel belongs to a feature-extractable region; and

determining a regularly shaped region of region of feature extractability from the binary mask.

9. The method of claim 8 wherein employing nearest neighbor analysis of pixels within the region of feature extractability to generate a binary mask further includes:

for each pixel,

sorting intensity values of nearest neighbor pixels to the pixel;

computing the average intensity of the nearest neighbor pixels;

when more than a threshold number of nearest neighbor intensity values are greater than the computed average intensity, setting a binary value in the binary mask corresponding to the pixel to indicate that the pixel is in a region of feature extractability; and

when a threshold number or less than a threshold number of nearest neighbor intensity values are greater than the computed average intensity, setting a binary value in the binary mask corresponding to the pixel to indicate that the pixel is not in a region of feature extractability.

10. The method of claim 8 wherein determining a regularly shaped region of region of feature extractability from the binary mask further includes:

computing a size of a regularly shaped region of feature extractability based on the binary mask; and

positioning the regularly shaped region of feature extractability so that the geometric center of the regularly shaped region of feature extractability coincides with a center of mass computed for the binary mask.

11. The method of claim 8 wherein computing a size of a regularly shaped region of feature extractability based on the binary mask further includes:

determining a size of a regularly shaped region of feature extractability so that a majority of pixels with corresponding binary-mask values indicating that the pixels are in a region of feature extractability are included in the regularly shaped region of feature extractability.

12. The method of claim 11 wherein the regularly shaped region of feature extractability includes one of:

a rectangular region specified by the lengths of two sides;

a disk-shaped region specified by a radius; and

an ellipsoid region specified by a major and a minor axis.

13 The method of claim 1 further comprising forwarding, to a remote location, feature-signal data extracted from the regularly shaped region of feature extractability.

14. A computer program implementing the method of claim 1 stored in a computer-readable medium.

15. Feature-signal data extracted from the regularly shaped region of feature extractability, determined by the method of claim 1, stored in a computer readable medium.

16. A microarray data processing system comprising:

a processor;

stored, computer readable microarray data;

a display device and a user input device; and

a program that

renders the microarray data for visual display;

displays the microarray data rendered for visual display;

receives a boundary of a region of feature extractability within the microarray; and

constructs a regularly shaped region of feature extractability from the received boundary of the region of feature extractability within the microarray.

17. The microarray data processing system of claim 16 wherein the program renders the microarray data for visual display by preparing a pixel-based, scanned image of the microarray with indications of putative feature positions.

18. The microarray data processing system of claim 17 wherein the program displays the microarray data rendered for visual display by displaying, on a computer display device, the pixel-based, scanned image of the microarray with indications of putative feature positions.

19. The microarray data processing system of claim 16 wherein the program receives a boundary of a region of feature extractability within the microarray by receiving a contour line enclosing the region of feature extractability.

20. The microarray data processing system of claim 16 wherein the program constructs a regularly shaped region of feature extractability from the received boundary of a region of feature extractability within the microarray by:

employing nearest neighbor analysis of pixels within the region of feature extractability to generate a binary mask with binary values, each binary value

indicating whether or not a corresponding pixel belongs to a feature-extractable region; and

determining a regularly shaped region of region of feature extractability from the binary mask.

21. The microarray data processing system of claim 20 wherein the program employs nearest neighbor analysis of pixels within the region of feature extractability to generate a binary mask by:

for each pixel,

sorting intensity values of nearest neighbor pixels to the pixel;

computing the average intensity of the nearest neighbor pixels;

when more than a threshold number of nearest neighbor intensity values are greater than the computed average intensity, setting a binary value in the binary mask corresponding to the pixel to indicate that the pixel is in a region of feature extractability; and

when a threshold number or less than a threshold number of nearest neighbor intensity values are greater than the computed average intensity, setting a binary value in the binary mask corresponding to the pixel to indicate that the pixel is not in a region of feature extractability.

22. The microarray data processing system of claim 20 wherein the program determines a regularly shaped region of region of feature extractability from the binary mask by:

computing a size of a regularly shaped region of feature extractability based on the binary mask; and

positioning the regularly shaped region of feature extractability so that the geometric center of the regularly shaped region of feature extractability coincides with a center of mass computed for the binary mask.

23. The microarray data processing system of claim 22 wherein the program computes a size of a regularly shaped region of feature extractability based on the binary mask by:

determining a size of a regularly shaped region of feature extractability so that a majority of pixels with corresponding binary-mask values indicating that the pixels are in a region of feature extractability are included in the regularly shaped region of feature extractability.

24. The microarray data processing system of claim 16 wherein the regularly shaped region of feature extractability is one of:

a rectangular region specified by the lengths of two sides;

a disk-shaped region specified by a radius; and

an ellipsoid region specified by a major and a minor axis.

25. A method for processing microarray data, the method comprising:

rendering the microarray data for visual display;

displaying the microarray data rendered for visual display;

receiving as input an irregularly shaped region of feature extractability within the microarray;

constructing a regularly shaped region of feature extractability from the received boundary of the region of feature extractability within the microarray; and

extracting feature signals from the regularly shaped region of feature extractability.

26. A microarray data processing system comprising:

a processor;

stored, computer readable microarray data;

a display device and a user input device; and

a program that

renders the microarray data for visual display;

displays the microarray data rendered for visual display;

receives as input an irregularly shaped region of feature extractability within the microarray; and

constructs a regularly shaped region of feature extractability from the received boundary of the region of feature extractability within the microarray.